

Date: Thursday, 3/30/2006 8:33:06 AM  
 User: Kim Johnston

## Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: FWD TUBE ASSEMBLY
Job Number	: 26428		
Estimate Number	: 10467		
P.O. Number	: N/A	Part Number	: D3391021
This Issue	: 3/30/2006 S.O. No. : N/A	Drawing Number	: D3391 REV D
Prsht Rev.	: NC	Project Number	: N/A
First Issue	: NA Type : MACHINED PARTS	Drawing Revision	: D
Previous Run	: 26427	Material	: N/A
Written By	: <u>SEE COMMENT BELOW</u>	Due Date	: 4/20/2006 Qty: 1 Um: Each
Checked & Approved By	: <u>06.03.30</u>		
Comment	: Est. A 05.09.13 New issue KJ/JLM Est. B 06.02.10 Dwg rev.D ech 773 EC		

## Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	D6013047	SKIDTUBE MAT'L
-----	----------	----------------



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

SKIDTUBE MAT'L

Pick:

Qty	Part Number	Description	Batch
1	D6013-047	Extrusion	B23935 DP 06-4-9

2.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1
-----	----------------	-------------------------



Comment: LANDING GEAR RESOURCE 1

Cut extrusion to 46.52 +0.010 -0.020

3.0	BENDING	BENDING MACHINE
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Comment: No bender

Bend as per Dwg D3391 Using Bend Prog 3391021

DP 06-4-12

4.0	QC5	INSPECT WORK TO CURRENT STEP
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Comment: INSPECT WORK TO CURRENT STEP

5.0	HAAS1	HAAS CNC VERTICAL MACHINING #1
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Comment: HAAS CNC VERTICAL MACHINING #1

1-Machine as per Folio FA590 Rev. AA &amp; Dwg D3391 Rev. D

Identify as D3391-1

2-Deburr

7/2 06/04/15

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes ☒ No ☐ DQA: PP Date: 06/05/12  
 QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
06-04-12	3	In cooler wheel on CXC bander is damaged causing slipping of the part on the rollers. bend was too long a part.	<i>PP</i>	Scrap & replace tube. Replace in cooler wheel for more precise banding	<i>PP</i> 06-04-12	<i>PP</i> 06-04-12	<i>PP</i>	<i>PP</i> 06-04-12

NOTE: Date & initial all entries

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Drawing Name: FWD TUBE ASSEMBLY

Job Number: 26428

Part Number: D3391021

Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

*gmk 06/04/15 1*

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

*MVS 06/04/26 1*

8.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill and c/sink float bag holes as per Dwg D3391 using DT8798(Do not open tow cap holes to finish size)  
(ONLY DRILL HOLES MARKED "A") *BE 06/04/27 ①*

2-Drill Remaining two holes for tow cap using DT 8819 Locating off of .1875" holes drilled in previous step *BE 06/04/27 ①*

3-Open tow cap holes to .208" as per Dwg D3391 *BE 06/04/27 ①*

4-Open Tow Ring hole to .640" as per Dwg D3391 *BE 06/04/27 ①*

5-Drill wearplate holes as per Dwg D3391 Using Dt8217 & DT8878 *BE 06/04/27 ①*

6--Deburr *BE 06/04/27 ①*

9.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Acid etch and Alodine as per QSI 005 4.1

*FC 0605 03 ①*

10.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3

*a.m 06-5-03 ①*

11.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

*DL 06/05-03 ①*

*8.1 QC5 DP 06-5-2*

*9.1 QC3 06/05-02*

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
06/05/25	8/9	change steady made.					06/05/25

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Date: Thursday, 3/30/2006 8:33:06 AM  
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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: FWD TUBE ASSEMBLY

Job Number: 26428

Part Number: D3391021

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

D3401041

Tow Cap Assembly



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Tow Cap Assembly

Pick:

Qty	Part Number	Description	Batch
1	D3401-041	Tow Cap	B26590

13.0

AN3C4A

BOLT



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Pick:

Qty	Part Number	Description	Batch
4	AN3C4A	Bolt	M100651

14.0

NAS1330C3KB166



Comment: Qty.: 14.0000 Each(s)/Unit Total : 14.0000 Each(s)

Rivnut

Pick:

Qty	Part Number	Description	Batch
14	NAS1330C3KB166	Insert	M100732

15.0

NAS1515H3L

WASHER



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Washer

Pick:

Qty	Part Number	Description	Batch
4	NAS1515H3L	Washer	M100186

16.0

AN960C10L

washer



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

washer

M18822 a.m. 06/05/28 (1)

17.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: SMALL & MEDIUM FAB RESOURCE 1

Install inserts and Tow Cap as per Dwg D3391

Identify as D3391-021

a.m. 06/05/28 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Drawing Name: FWD TUBE ASSEMBLY

Job Number: 26428

Part Number: D3391021

Job Number:



Seq. #:

Machine Or Operation:

Description :

18.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

Inspect thread of each insert using DT8821

DL 06/05/18 (1)

19.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: W/A

DL 06/05/24 (1)

20.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

DL 06/05/29 (1)

Job Completion



W 06/05/29

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

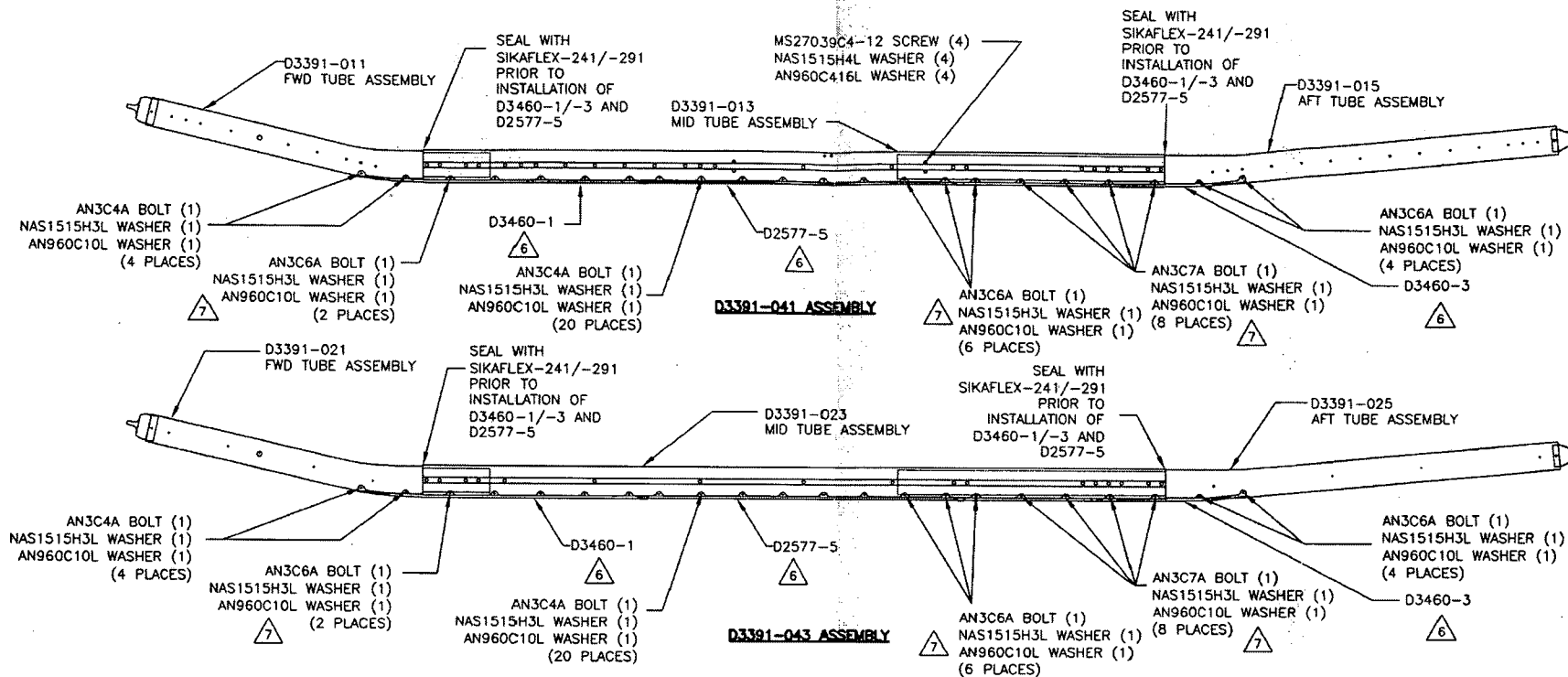
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries





# **D3391-041/-043 FLOAT SKIDTUBE ASSEMBLY PARTS LIST**

QTY - 041	QTY - 043	PART NUMBER	DESCRIPTION
X	X	D3391-041	FLOAT SKIDTUBE ASSEMBLY
		D3391-043	FLOAT SKIDTUBE ASSEMBLY
1		D3391-011	FWD TUBE ASSEMBLY
1		D3391-013	MID TUBE ASSEMBLY
1		D3391-015	AFT TUBE ASSEMBLY
	1	D3391-021	FWD TUBE ASSEMBLY
	1	D3391-023	MID TUBE ASSEMBLY
	1	D3391-025	AFT TUBE ASSEMBLY
24	24	AN3C4A	BOLT
12	12	AN3C6A	BOLT
8	8	AN3C7A	BOLT
44	44	NAS1515H3L	WASHER
44	44	AN960C10L	WASHER
4		MS27039C4-12	SCREW
4		NAS1515H4L	WASHER
4		AN960C416L	WASHER
1	1	D2577-5	WEARSHOE
1	1	D3460-1	WEARSHOE
1	1	D3460-3	WEARSHOE

## **GENERAL NOTES**

- ALL DIMENSIONS ARE IN INCHES
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- FINISH: ACID ETCH AND ALODINE PER DART QSI 005 4.1  
POWDER COAT WHITE (4.3.5.1) PER DART QSI 005 4.3
- SPRAY INSIDE OF TUBE WITH A COAT OF LPS LABORATORIES "LPS-3" AFTER FINISH AND AFTER INSTALLATION OF INSERTS. COAT ALL EXPOSED FASTENERS WITH LPS LABORATORIES "LPS PROCYON" AFTER FINAL ASSEMBLY. CLEAN EXCESS OFF POWDER COATING WITH MEK DEGREASER.
- USE DART DRILL TEMPLATE DT8217 TO LOCATE AND DRILL 'E' SIZE HOLES (#0.250-#0.257) FOR WEARSHOE INSERTS.
- C/SINK #0.391/#0.425 x 100" AS APPLICABLE AND INSTALL INSERTS EXCEPT WHERE INDICATED.
- APPLY A LAYER OF SIKAFLEX -241/-291 ADHESIVE BETWEEN THE BOTTOM OF THE SKIDTUBE ASSEMBLY AND THE WEARPLATES\*
- DO NOT TORQUE; HAND TIGHTEN ONLY

NO. 204228  
WORK ORDER  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
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ENGINEERING  
RETURN TO  
SHOP COPY

**RELEASED**

06.01.27

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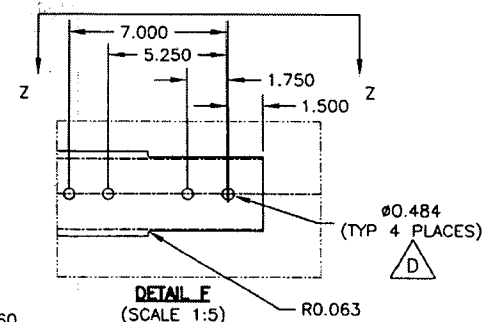
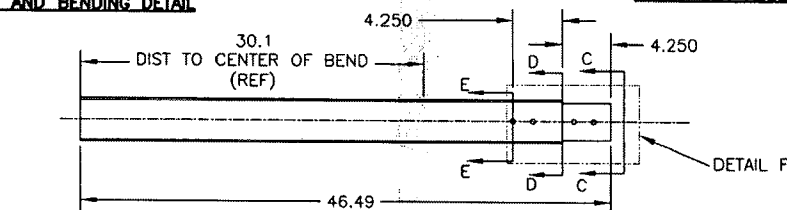
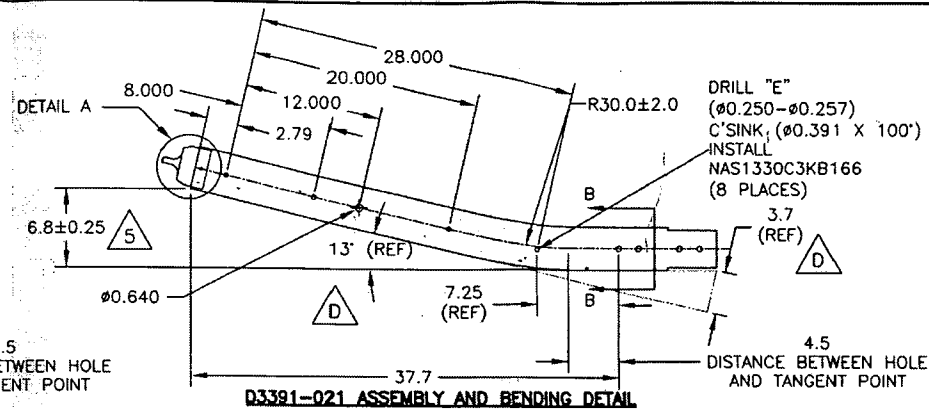
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D	06.01.23	UPDATE TOLERANCE, CHANGE HOLE SIZE
C	05.09.27	LENGTHEN AFT EXTENSION
B	05.06.10	DRAWING UPDATES
A	05.02.07	NEW ISSUE
DESIGN	PH	DRAWN BY
CHECKED	PH	APPROVED
DATE	06.01.23	TITLE
		412 FLOAT SKIDTUBE
		SCALE
		NTS

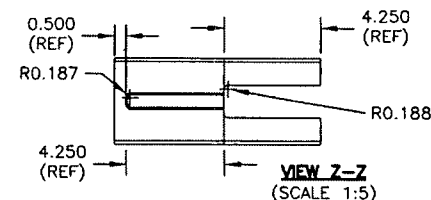
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PORT HADLOCK, MA

DRAWING NO. D3391

SHEET 1 OF 5



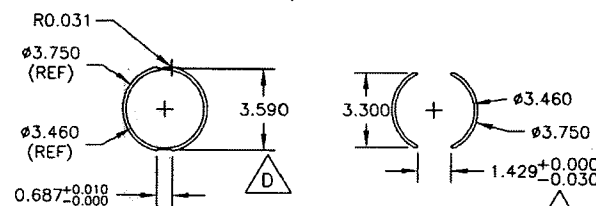
RELEASE  
06.01.27



QTY - 011	QTY - 021	PART NUMBER	DESCRIPTION
X		D3391-011	FWD TUBE ASSEMBLY
	X	D3391-021	FWD TUBE ASSEMBLY
1	1	D6013-047	FWD TUBE
1	1	D3401-041	TOW CAP
4	4	AN3C4A	BOLT
4	4	NAS1515H3L	WASHER
4	4	AN960C10L	WASHER
24	14	NAS1330C3KB166	INSERT

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SUBJECT TO AN ENDMENT  
WITHOUT NOTICE  
ENGINEERING  
BOLT  
WASH  
WASH  
INSER  
COPY  
UN TO  
FWD 1  
TOW 0  
NO. 26428  
WORK ORDER

-1 DRILLING AND CUTTING DETAIL  
(FROM D6013-047 SKIDTUBE MATERIAL)



**SECTION D-D**  
(SCALE 1:5)

**SECTION C-C**  
(SCALE 1:5)

**SECTION B-B**  
(SCALE 1:5)

5 DRILL "E"  
( $\phi 0.250 - \phi 0.257$ )  
C'SINK ( $\phi 0.391 \times 100^\circ$ )  
INSTALL  
NAS1330C3KB166  
(6 PLACES)

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PH	PH

CHECKED	APPROVED
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DATE  
06.01.23

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PORT HADLOCK, OH

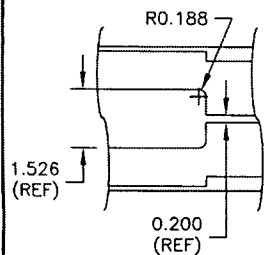
DRAWING NO.  
D3391

TITLE
412 FLOAT SKIDTUBE

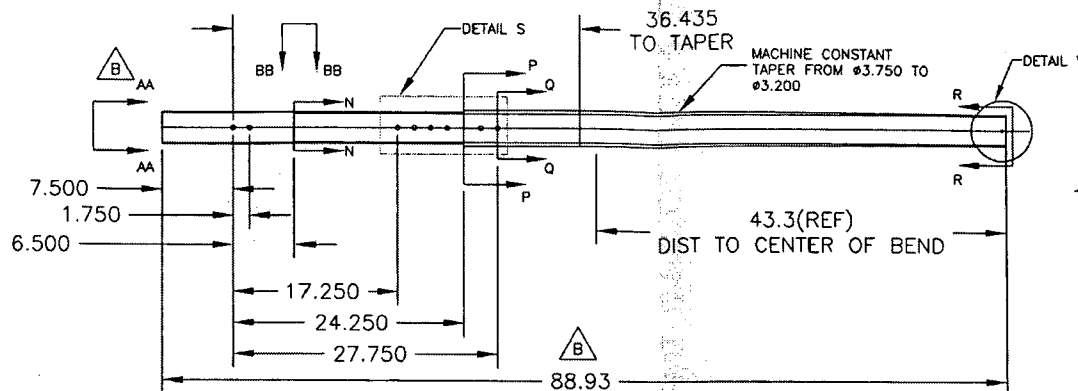
REV. 0

SHEET 2 OF 5

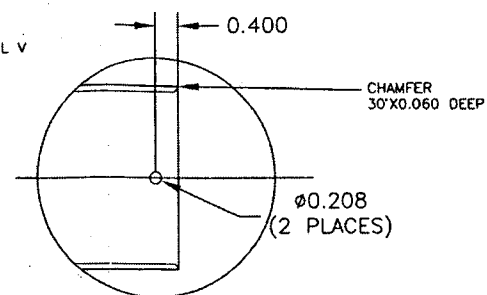




VIEW BB-BB  
(SCALE 1:3)



D3391-3 AFT DRILLING AND CUTTING DETAIL  
(MAKE FROM D6014-090 SKIDTUBE MATERIAL)

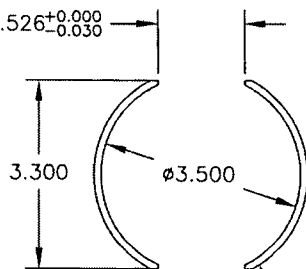


DETAIL V  
(SCALE 1:2)

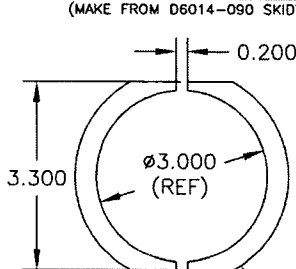
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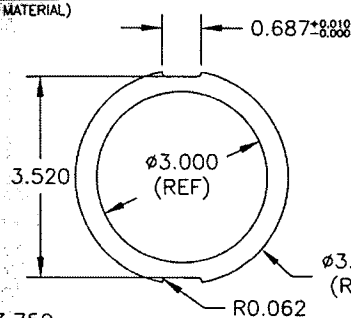
1.526<sup>+0.000</sup><sub>-0.030</sub>



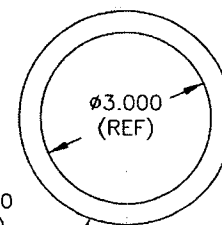
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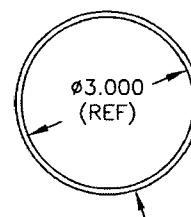
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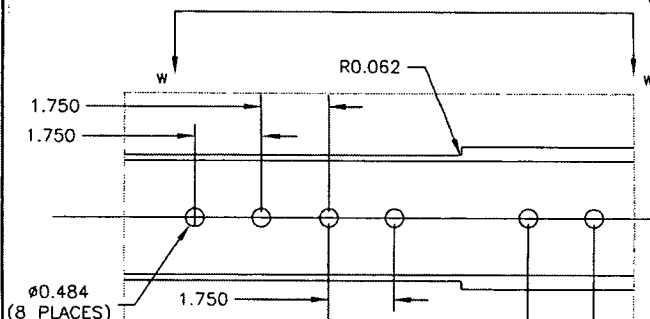
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(SCALE 1:2)



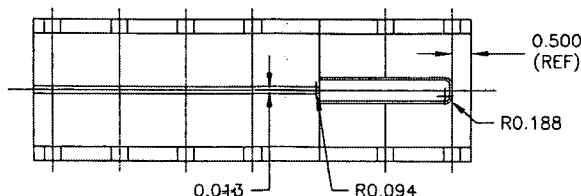
SECTION Q-Q  
(SCALE 1:2)



SECTION R-R  
(SCALE 1:2)



DETAIL S  
(SCALE 1:3)



VIEW W-W  
(SCALE 1:3)

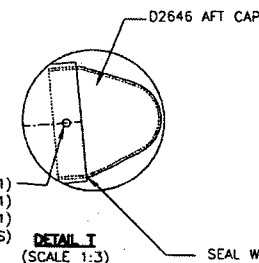
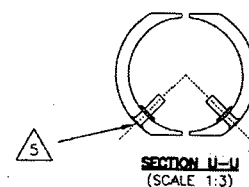
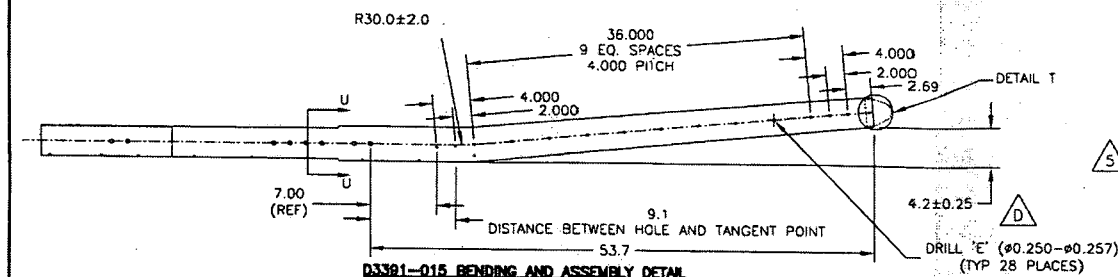
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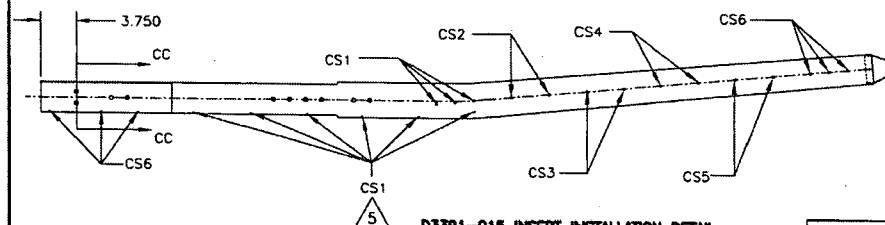
DESIGN	PH	DRAWN BY	PH	<b>DART</b> DART AEROSPACE USA, INC. PORT HADLOCK, MA	REV. D
CHECKED	#	APPROVED	#	DRAWING NO. D3391	SHEET 4 OF 5
DATE	06.01.23	TITLE	412 FLOAT SKIDTUBE	SCALE	1:12

RELEASED  
06.01.27



AN3C4A BOLT (1)  
NAS1515H3L WASHER (1)  
AN960C10L WASHER (1)  
(2 PLACES)

SEAL WITH  
SIKAFLEX-241/-291

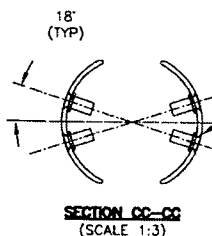
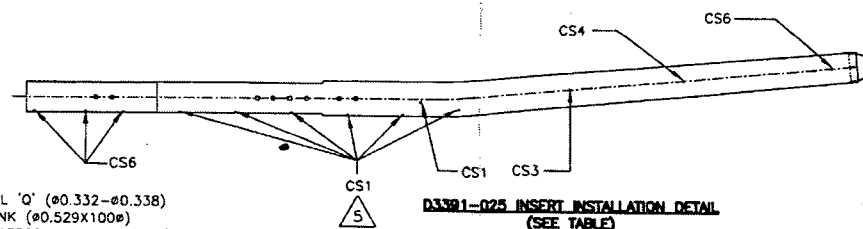
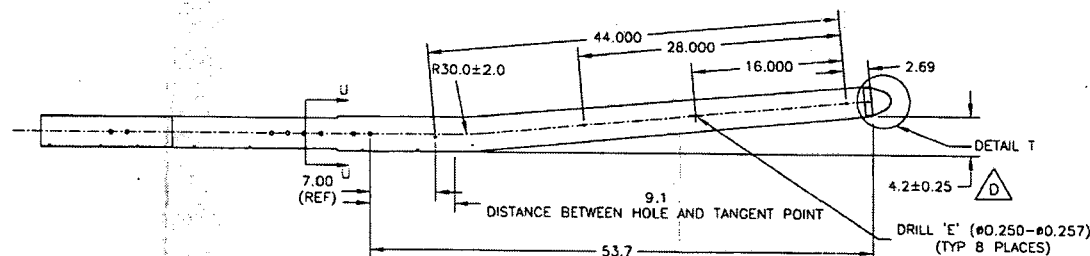


C'SINK AND INSTALL AESS10KBXXX AND/OR  
NAS1330C3KBXXX IN HOLES MARKED CS1-CS6 AS  
FOLLOWS

HOLES MARKED	QTY D3391-015	QTY D3391-025	C'SINK	P/N
CS1	18	14	Ø0.425	AESS10KB366
CS2	4		Ø0.391	AESS10KB366
CS3	4	2	Ø0.391	NAS1330C3KB316
CS4	4	2	Ø0.391	NAS1330C3KB266
CS5	4		Ø0.391	NAS1330C3KB216
CS6	12	8	Ø0.391	NAS1330C3KB166

**D3391-015/-025 AFT TUBE ASSEMBLY PARTS LIST**

QTY - 015	QTY - 025	PART NUMBER	DESCRIPTION
X		D3391-015	AFT TUBE ASSEMBLY
	X	D3391-025	AFT TUBE ASSEMBLY
1	1	D6014-090	AFT TUBE
1	1	D2646	AFT CAP
18	14	AESS10KB366	INSERT
4	2	NAS1330C3KB316	INSERT
4	2	NAS1330C3KB266	INSERT
4		NAS1330C3KB216	INSERT
12	8	NAS1330C3KB166	INSERT
4		NAS1330C4KB151	INSERT
2	2	AN3C4A	BOLT
2	2	NAS1515H3L	WASHER
2	2	AN960C10L	WASHER



DRILL 'O' (Ø0.332-Ø0.338)  
C'SINK (Ø0.529X100°)  
NAS1330C4KB151 INSERT (1)  
(4 PLACES)

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DESIGN PH	DRAWN BY PH	<b>DART</b> DART AEROSPACE USA, INC. PORT HADLOCK, OH
CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D3391
DATE 06.01.23	TITLE 412 FLOAT SKIDTUBE	REV. D SHEET 5 OF 5 SCALE 1:12

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WORK ORDER  
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## Peter Hum

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**From:** David Shepherd [davids@dartaero.com]  
**Sent:** Friday, April 21, 2006 10:59 AM  
**To:** Peter Hum  
**Subject:** Re: D3391-1 fwd tube tolerance update

The deviation on tolerance shown in your sketch is acceptable for current production and would be acceptable for future production with a drawing change and confirmation that production can work to these tolerances.

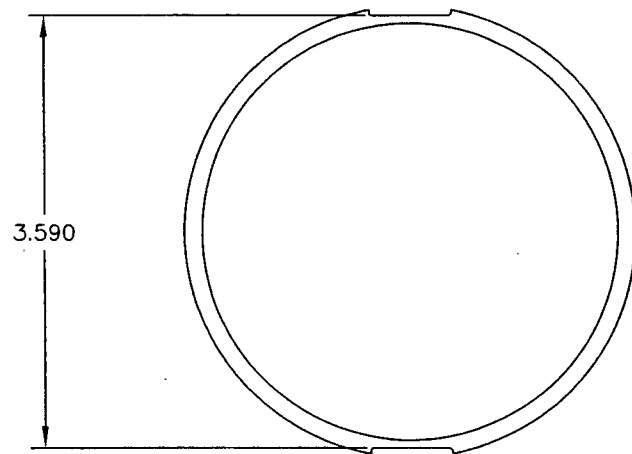
When you do the design review for the drawing change, ensure to include the sketch. I would suggest that we submit the updated dwg when we submit the drawings for the cable guard.

David

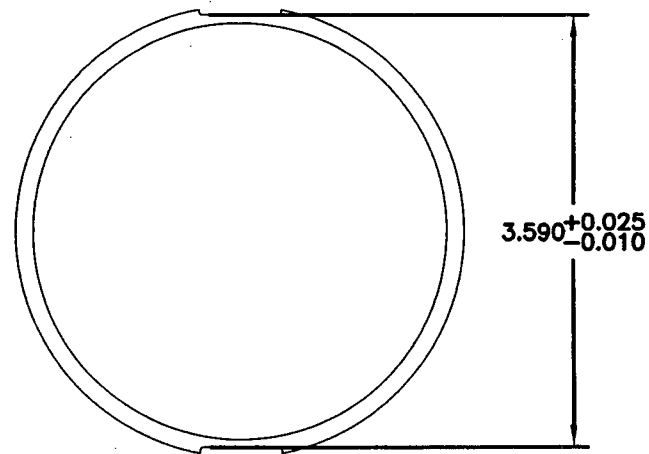
----- Original Message -----

**From:** "Peter Hum" <phum@dartaero.com>  
**To:** "David Shepherd (E-mail)" <davids@dartaero.com>  
**Sent:** Wednesday, April 19, 2006 12:53 PM  
**Subject:** D3391-1 fwd tube tolerance update

> David,  
>  
> I've attached a sketch (the proposed changes are in black),  
>  
> In machining the D3391-1 fwd tube, the dimensions of Section D-D and  
Section  
> C-C vary above/below the specified tolerance. In the majority of the cases  
> the end result is more material and therefore an increase in strength.  
>  
> At the worst case tolerance (i.e. smallest area) the reduction in area is  
> 0.5%. However in the critical section of the FWD tube, the ultimate margin  
> of safety is 21%. Therefore, this reduction in area is very small compared  
> to the overall margin of safety; therefore it will be acceptable.  
>  
> Can these deviations be applied to current and future production (will  
> require drawing update)?  
>  
> Peter  
>  
>

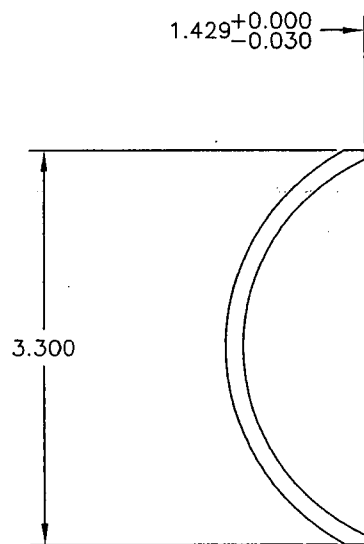


NOMINAL DIMENSION



NEW DIMENSION/TOLERANCE  
1) WORST CASE IS MORE MATERIAL

## SECTION D-D

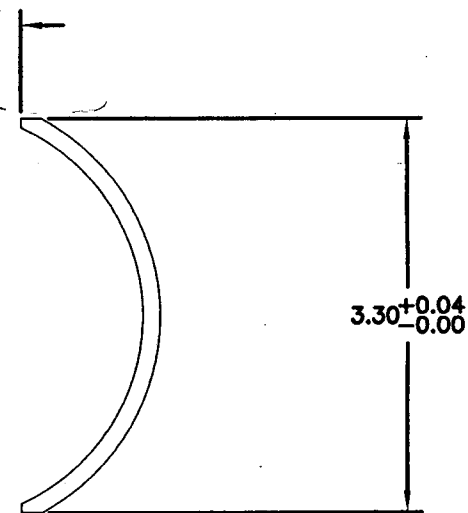


NOMINAL DIMENSION  
AREA = 1.1853 IN<sup>2</sup>



$1.430^{+0.040}_{-0.060}$

NEW DIMENSION/TOLERANCE  
MINIMUM AREA = 1.179 IN<sup>2</sup>



$3.30^{+0.04}_{-0.00}$

- 1) AT THE WORST CASE THE AREA IS REDUCED BY 0.5%
- 2) THE ULTIMATE MARGIN OF SAFETY OF THE CRITICAL SECTION IN THIS REGION OF THE SKIDTUBE IS 21%
- 3) THEREFORE, THIS REDUCTION WILL NOT BE A FACTOR

## SECTION C-C



